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ORIGINAL ARTICLE

Psychosocial factors of coronary heart disease and quality of life among Roma coronary patients: a study matched by socioeconomic position

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Abstract
Objectives The aim of this study was to assess whether psychosocial factors and health-related quality of life (HRQL) differ between Roma and non-Roma coronary patients and to what degree socioeconomic status (SES) explains these differences.
Methods We included 138 patients out of 437 interviewed: 46 Roma, all with low SES, 46 non-Roma with low SES, and 46 non-Roma with high SES. Groups were matched for age, gender and education. The GHQ-28 was used for measuring psychological well-being, the Maastricht interview for vital exhaustion, the type D questionnaire and the Cook–Medley scale for personality and the SF-36 for HRQL. SES was indicated by income and education, and disease severity by ejection fraction. ANOVA and linear regression were used.
Results Roma scored poorly compared to non-Roma in psychological well-being, vital exhaustion and HRQL ($p \leq 0.001$); however, these differences could be to a substantial extent explained by SES. With regard to personality traits, ethnicity and SES played a less significant role.
Conclusions The adverse quality of life among Roma coronary patients may warrant additional care, which should target their low SES but also other factors related to their ethnic background, such as culture and living conditions.

Keywords Coronary heart disease · Psychological risk factors · Quality of life · Roma patients · Socioeconomic status · Ethnic inequalities

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Introduction

Most of the Roma populations in the European Union live in central and eastern Europe. Previous communist regime and societal transformation in the 1990s brought about many socioeconomic changes, most of which had a negative impact on Roma: i.e. an increase in racist sentiment against this ethnic group and increased social passivity among the Roma population (Vivian and Dundes 2004; Zeman et al. 2003). In Slovakia, the Roma populations are the second most numerous ethnic minority (after Hungarians). In the 2001 census, 1.7% of the total population declared themselves to be Roma; however, their actual number according to the estimates of the Demographic Research Centre is substantially larger, at around 380,000 (7.2%), with the largest numbers living in the eastern regions of Slovakia (Vano 2002).

Hajioff and McKee (2002) concluded that research on Roma health issues is scarce and is largely focused on communicable diseases. The available evidence suggests increased morbidity from non-communicable disease, poorer access to health services, lower uptake of preventative care (Filadelfiova et al. 2007; Nesvadbova et al. 2002), health status perceived as bad and a higher prevalence of health-related risk factors among Roma compared to the non-Roma population (Kosa et al. 2007) A significantly lower life expectancy has also been reported (Koupilova et al. 2001).

There are few reports on coronary heart disease (CHD) among the Roma population. Nozdrovicky (1991, in Koupilova et al. 2001) reported cardiovascular diseases as the most common cause of death in the Roma community of Rakusy in Slovakia. Lifestyle risk factors had a high prevalence (high consumption of animal fat and low consumption of fruits and vegetables, obesity, very high prevalence of smoking and alcohol consumption as well as lack of physical activity). Another study (Dejmek et al. 2002) indicated an unfavorable diet and smoking habit among Roma pregnant women, with about 78% of Roma mothers reporting smoking as compared to 31% of non-Roma mothers. Other studies confirm the higher prevalence rate of risk factors and of coronary heart disease, metabolic syndrome and Type 2 diabetes among the Roma compared to the non-Roma population (Krajcovicova-Kudlackova et al. 2002; Vozarova de Courten et al. 2003).

In the research on health issues of Roma, it often remains unclear to what extent their poor health is influenced by their very low socioeconomic status, or whether other ethnicity-related factors such as different attitudes toward health and different lifestyle are more important. Studies comparing Roma with the majority population have shown that the Romas often do not perceive the connection between lifestyle and health as strongly causal, and that health and disease are in the hands of destiny anyway and are rather stoically and fatalistically accepted (Van Cleemput et al. 2007; Petek et al. 2004).

Data on CHD among the Roma population are sparse, and even less is known about psychosocial factors and quality of life among Roma coronary patients. The role of these factors in CHD has been widely studied and are important in both the etiology and prognosis of CHD (Bobak and Marmot 2005; Kop 2003). The most commonly reported variables connected to increased CHD morbidity and mortality risks are depression and vital exhaustion (Appels et al. 2006; Brummett et al. 2005, Kuper et al. 2005), type D personality (Denollet 2005) and hostility (Boyle et al. 2004). Health-related quality of life (HRQL) is also a factor of high clinical relevance in this context. It comprises various physical, mental, social and economic components, and evaluates mainly the physical and mental status of patients as a reflection of their disease. In several studies, it has been found that HRQL is an important predictor of general and cardiovascular mortality and morbidity even after adjustment for other conventional risk factors (Lenzen et al. 2007).

The aim of this study was to assess whether psychosocial factors and health-related quality of life differ between Roma and non-Roma CHD patients, and to what extent socioeconomic position explains these differences. Based on previous studies on health among Roma populations, and bearing in mind the specific cultural and social background of this group, significant differences were expected between Roma and non-Roma coronary patients regarding these factors.

Methods

Patients who had been referred to the East Slovakian Institute for Cardiac and Vascular Diseases in Kosice for coronary angiography (CAG) were included in the study. Patients with cardiovascular disease from all of eastern Slovakia (about 1.5 million inhabitants) are referred to this medical centre for diagnosis and treatment. At the time of their admission to the center, patients were invited to participate in the study focused on the quality of life among patients with coronary heart disease. From 537 patients enrolled during the period from November 2004 to June 2007, 46 patients had Roma ethnicity. In this particular study, we included three groups of patients, each consisting of 46 people (total of 138 participants). In the first group, there were 46 Roma patients, almost all with low socioeconomic status (SES); the second group consisted of 46 non-Roma patients with low SES (randomly matched with Roma patients in terms of education, age, gender and type of intervention after CAG); and in the third group, 46 non-Roma patients were included with high SES randomly matched with the first group in terms of age, gender and type of intervention after CAG.

The type of intervention after coronary angiography, which is a general indicator of the seriousness of the disease, was divided into three categories: ‘pharmaceutically’, ‘percutaneous transluminal coronary angioplasty’ (PTCA) or ‘coronary artery bypass grafting’ (CABG). General inclusion criteria in the study were as follows: coronary heart disease (CHD) in the medical history, age <75 years, no psychiatric disorders in the medical history and no serious co-morbidity. Participants were provided with information about the study and they signed an informed consent letter. Ethical approval for this study was obtained from the Ethical Committee of the East Slovakian Institute for Cardiac and Vascular Diseases in Kosice. The response rate was 96%, and there were no significant differences

between respondents and non-respondents in age or gender. A structured interview was conducted with each patient by a trained interviewer, and medical data were obtained from the medical records of patients.

To assess psychological well-being, the 28-item version of the General Health Questionnaire (GHQ 28) was used (Goldberg and Hilier 1979). The GHQ 28 consists of four subscales: physical symptoms, anxiety and insomnia, impairment of social functioning and depression. The score for each subscale ranges from 0 to 21, and the total GHQ 28 score is between 0 and 84, with a higher score indicating poor mental health status. The questionnaire has been shown to have acceptable consistency and validity (Goldberg and Williams 1988). The psychometric properties of the Slovak version of the GHQ 28 have been reported in a study by Nagyova et al. (2002). In the present study, the Cronbach's alpha was 0.92.

The structured Maastricht Interview for Vital Exhaustion measures feelings of exhaustion and consists of 23 questions on experiences such as tiredness, lack of energy, irritability or disrupted sleep (Meesters and Appels 1996a). The score ranges from 0 to 46. The cutoff point at 17 or higher identifies a participant as 'exhausted'. The scale has been found to have good psychometric properties of validity and reliability (Meesters and Appels 1996b). In the present study, the Cronbach's alpha was 0.87. This measure was administered as a personal interview with each patient (carried out by a trained psychologist).

Type D personality was measured with the 14-item Type D Personality Scale (DS14). Type D personality is characterized by the tendency to experience negative emotions and not express these emotions in social interactions. It consists of two subscales: negative affectivity (NA) and social inhibition (SI). A score of 10 or more on both subscales denotes those with a Type D personality. The DS14 has adequate reliability and validity (Denollet 2005). In the present study, Cronbach's alpha was 0.76.

Hostility was assessed using the 27-item version of the Cook–Medley Hostility Scale, comprising three subscales, cynicism, aggressive responding and hostile affect, which are thought to reflect the cognitive, behavioral and mood components of hostility. This scale has been demonstrated as a good predictor of CHD and has acceptable validity and reliability (Barefoot et al. 1989). In the present study, Cronbach's alpha was 0.71.

SF 36 was used to measure the health-related quality of life. The four subscales of the SF-36 (vitality, emotional role limitations, mental health and social functioning) can be summarized into a mental functioning component summary, physical functioning, role limitations due to physical health problems and bodily pain; and general health perceptions can be summarized into a physical functioning component summary. The summary score ranges from 0 to 100, with lower scores indicating a poor quality of life (Ware et al. 1994). A validation study of the SF-36 among coronary patients confirmed good psychometric properties (Failde and Ramos 2002).

Income level and education were used as the indicators of socioeconomic status (SES). Participants' education was assessed as basic (including also unfinished basic education), middle (lower secondary without school-leaving exams and secondary with the graduation exams) and high (university education). Participants' income was divided into three levels: (1) low income (lower than the 'minimum wage'), (2) middle income (higher than the 'minimum wage'), and (3) high income (twice the 'minimum wage' and higher). 'Minimum wage' is an indicator of financial situation, which is adjusted for the income of all family members. An official scheme for assessing minimum wage (prepared by the Slovak Ministry of Social Affairs) was employed. People with an income lower than the minimum wage are considered to live under the 'poverty level' and are entitled to receive social benefits.

Disease severity was measured by functional status and ejection fraction. Functional status was assessed by a cardiologist based on two scales: NYHA, four classes according to the New York Heart Association classification of dyspnea symptoms (Criteria committee of the New York Heart Association 1994), and the Canadian Cardiovascular Society (CCS) checklist that assesses the severity of chest pain in four classes (Campeau 1976). In both scales, a higher classification represents a poor functional status. In this study functional status is calculated using the worst level from these two scales.

Ejection fraction (EF) as the measure of the systolic function of the left ventricle was indicated by echocardiography. EF may be reported as normal (>50%), borderline normal (40–50%) or systolic dysfunction that is: mild (30–39%), moderate (20–29%) and severe (<20%) (McGowan and Cleland 2003).

We first described the demographic and basic medical characteristics of each group. Second, we used a one-way analysis of variance (ANOVA) and Scheffe post hoc tests to explore the differences in psychological variables and HRQL between groups (Roma, non-Roma with low SES and non-Roma with high SES).

Next, hierarchical linear regression models (enter method) were employed to examine the effect of ethnicity on the psychological variables (psychological well-being, vital exhaustion, type D personality, hostility) and HRQL. Age and gender were included in the regression models as potential confounding variables in the second step. Furthermore, the regression model was adjusted for the effect of income and education. In the final model, ejection fraction was included to control for the potential effect of

disease severity. Analyses were performed using SPPS 16.0.1 for Windows.

Results

The mean age of participants in our study was 53.5 years, and 22% were women. These characteristics were similar in all three SES groups. Other sociodemographic and medical characteristics of the research groups are presented in Table 1.

Analysis of variance and Scheffe post hoc tests (Table 2) revealed differences among Roma, low-SES non-Roma and high-SES non-Roma patients. In *psychological well-being*, Roma patients differed significantly from both non-Roma with low SES and non-Roma with high SES patients. In *vital exhaustion* and *hostility*, Roma and non-Roma patients with low SES scored significantly higher than non-Roma with high SES, with the group of non-Roma patients with high SES being the only one where the mean was lower than the cutoff point for diagnosing vital exhaustion. In the *NA subscale of the Type D* questionnaire, only Roma and high-SES non-Roma patients differed significantly. In the *SI subscale of the Type D* questionnaire, no statistically significant results were found; however, it is necessary to point out that the means in all three groups of patients were higher than the cutoff score for Type D questionnaire. In both mental and physical components of *HRQL*, Roma patients scored significantly poorly than non-Roma with high SES patients.

In the multivariate linear regression models containing age, gender and ethnicity, ethnicity was a significant

Table 1 Basic demographic and medical characteristics of study participants

	Roma	Non-Roma		Total study sample
		Low SES	High SES	
Total number	46	46	46	138
Age				
Mean	52.7	53.2	54.5	53.5
SD	7.1	6.3	7.0	6.8
Range	27–71	39–64	38–72	27–72
Gender				
Males	36 (78.3%)	36 (78.3%)	36 (78.3%)	108 (78.3%)
Females	10 (21.7%)	10 (21.7%)	10 (21.7%)	30 (21.7%)
Education				
Unfinished basic	3 (6.5%)	–	–	3 (2.2%)
Basic	33 (71.1%)	35 (76.1%)	–	68 (49.3%)
Lower secondary	8 (17.4%)	8 (17.4%)	–	16 (11.6%)
Secondary (graduate)	1 (2.2%)	2 (4.3%)	–	4 (2.9%)
High (university)	1 (2.2%)	1 (2.2%)	46 (100%)	47 (34.1%)
Income				
Low	28 (63.6%)	5 (12.5%)	17 (40.5%)	33 (26.2%)
Middle	13 (29.5%)	31 (77.5%)	25 (59.5%)	61 (48.4%)
High	3 (6.8%)	4 (10.0%)		32 (25.4%)
Ejection fraction				
EF = 20–29%	1 (2.6%)	2 (4.5%)	–	3 (2.4%)
EF = 30–39%	7 (17.9%)	11 (25.0%)	2 (4.8%)	20 (16%)
EF = 40–49%	10 (25.6%)	9 (20.5%)	12 (28.6%)	31 (24.8%)
EF > 50%	21 (53.8%)	22 (50.0%)	28 (66.7%)	71 (56.8%)
Functional status				
Class I–II.	21 (46.7%)	21 (45.7%)	25 (59.5%)	67 (50.4%)
Class III–IV	24 (53.3%)	25 (54.3%)	17 (40.5%)	66 (49.6%)
Type of intervention				
Pharmacotherapy	17 (31.1%)	17 (31.1%)	17 (31.1%)	50 (29.2%)
PCI/stent	10 (21.7%)	10 (21.7%)	12 (31.9%)	33 (24.1%)
CABG	19 (41.3%)	19 (41.3%)	17 (37.0%)	55 (40.2%)

Table 2 Differences between research groups in psychological factors and HRQL tested with one-way analysis of variance (ANOVA) and Sheffe post hoc tests

	Group 1. mean	Group 2. mean	Group 3. mean	*F* value	*p* value	Sheffe test differences between groups
GHQ, total score	34.0	26.8	22.2	10.80	**0.001**	1–2, 1–3
Vital exhaustion	26.1	22.1	13.8	19.80	**0.001**	1–3, 2–3
Hostility	17.6	16.1	13.4	10.70	**0.001**	1–3, 2–3
Type D						
NA	13.6	11.8	10.1	3.73	**0.05**	1–3
SI	12.9	12.8	11.0	2.20	0.12	–
SF-36						
Mental	50.7	60.3	66.7	8.61	**0.001**	1–3
Physical	37.9	50.7	60.5	12.42	**0.001**	1–3

Group 1: Roma

Group 2: non-Roma with low socioeconomic status

Group 3: non-Roma with high socioeconomic status

The higher the GHQ score, the lower was the psychological well-being (anxiety, depression)

A higher score in hostility, vital exhaustion and type D subscales indicate a higher level of psychological trait

The higher the SF36 score, the better was the health-related quality of life

predictor in almost all variables: psychological well-being, vital exhaustion, hostility, and the physical and mental components of the HRQL. After the inclusion of income and education into the regression model, the effect of ethnicity disappeared in all the variables with the exception of the physical component of HRQL. SES was significantly related to the following variables: psychological well-being, vital exhaustion and health-related quality of life. After the inclusion of ejection fraction, the influence of ethnicity did not change significantly (Table 3).

Discussion

Our study showed that Roma coronary patients had poorer outcomes than non-Roma patients in psychological factors that are relevant for the prognosis of coronary heart disease: e.g., psychological well-being (anxiety, depression) and vital exhaustion. Similarly, Roma patients scored poorly in both mental and physical components of the health-related quality of life. However, these differences could to a substantial extent be explained by the socioeconomic status of the Roma population.

Table 3 Effects of ethnicity on psychological variables and HRQL: results of a linear regression model

	Equation 1 Ethnicity β (95% CI)	Equation 2 Ethnicity adjusted for age, gender β (95% CI)	Equation 3 Ethnicity adjusted for age, gender SES β (95% CI)	Equation 4 Ethnicity adjusted for age, gender EF% β (95% CI)
GHQ-28	−0.36 (−14.12; −5.03)***	−0.37 (−14.21; −5.03)***	−0.11 (−8.30; 2.33)	−4.15 (−14.81; −5.24)***
Vital exhaustion	−0.36 (−11.53;−4.35)***	−0.36 (−11.43;−4.34)***	−0.45 (−4.92; 2.99)	−0.37 (−12.06; −4.43)***
Hostility	−0.31 (−4.60; −1.15)***	−0.31 (−4.58; −1.13)**	−0.19 (−3.87; 0.42)	−0.33 (−4.89; −1.20)***
Type D				
NA	−0.21 (−4.91; −0.40)*	−0.20 (−4.70; −0.30)*	−0.01 (−2.70; 2.58)	0.19 (−4.81; 0.03)*
SI	−0.11 (−3.07; 0.81)	−0.09 (−2.95; 0.91)	0.02 (−2.05; 2.52)	−0.08 (−2.92; 1.19)
SF-36				
MHS	0.32 (6.02; 19.84)***	0.32 (5.97; 19.88)***	0.12 (−3.50; 13.15)	0.31 (5.22; 20.41)***
PHS	0.37 (9.67; 26.06)***	0.38 (10.04; 26.20)***	0.21 (0.14; 19.57)*	0.35 (8.47; 25.10)***

SES socioeconomic status (income, education), *FS* functional status, *EF%* ejection fraction, *GHQ-28* General Health Questionnaire-28, *PHS* physical health status, *MHS* mental health status

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The design of our study enabled a proper assessment of the impact of SES and of other aspects of ethnicity on the outcome variables. In most variables (psychological well-being, vital exhaustion and HRQL), the impact of ethnicity on linear regression disappeared after the inclusion of socioeconomic status in the model (while SES was a significant predictor). Thus, our results support the assumption that a significant part of ethnic inequalities in quality of life and psychological factors may be explained by the poor socioeconomic position of the Roma population. Similarly to these findings, the study of Rosicova et al. (2009) focused on mortality differences and research by Stein Merkin et al. (2009) dealing with the management of hypercholesterolemia supports the high importance of socioeconomic factors significantly influencing the health indicators within ethnic minorities. Socioeconomic disadvantage has been shown in numerous studies to be consistently associated with a higher presence of CHD lifestyle risk factors (heavier smoking, poor nutrition, higher levels of cholesterol) and with a poor prognosis among coronary patients (Yarnell et al. 2005; Petrelli et al. 2006). However, it is necessary to take into account that the socioeconomic status of a considerable part of the Roma population (those living in separated settlements) is much lower than that of the majority population, with a much higher incidence of unemployment, criminality and dependency on government social welfare and very poor standard of living (Filadelfiova et al. 2007). In our sample, this was shown for instance by the fact that even in the low-SES non-Roma group, income levels were higher than in the low-SES Roma group. Furthermore, only among the Roma group were there patients with an unfinished basic education. Because of this, SES as measured may not fully adjust for 'real' differences in it.

One of the interesting findings in the study was that the functional status of the three groups was quite different (Table 1): the Roma group had a higher prevalence rate of Class III and IV symptoms than both the low-SES non-Roma and the high-SES non-Roma. This suggests that the Roma might be more symptomatic from their disease than the non-Roma patients at the time of their referral to the cardiologist.

With regard to personality traits, hostility seemed to be influenced by ethnic origin (higher scores among Roma), which was in line with some other studies where higher scores of hostility were found among ethnic minorities (Smart-Richman et al. 2007; Iribarren et al. 2002), probably associated with the experiences of discrimination.

The major strengths of the present study are that it adds evidence to a rarely investigated topic, ethnic differences at entry into specialist care, and that we can distinguish between the impacts of SES and ethnicity on the outcome variables.

However, due to our study's cross-sectional design, we could not further explore the mechanisms that might explain how SES is related to the psychological outcomes and HRQL among specific Roma populations. Based on literature, it might be hypothesized that chronic stress plays an important role in this context, which can result in adverse health outcomes through biological, psychosocial or behavioral pathways. Higher stress events connected with enduring financial stress and a lower capacity to develop adaptive behavioral strategies for controlling psychosocial conflicts might be connected with poor SES as well (Kopp and Rethelyi 2004). Also, other factors (social participation, social exclusion, feelings of discrimination) might be important in influencing the quality of life and psychological outcomes among Roma patients.

Moreover, our results might be biased by other factors, such as access to treatment or diagnostic procedures, e.g., selection bias might be present. Because of the backward social position of the Roma population, some of them may have reached the specialized cardiology treatment relatively late. Such a selection bias would have led to Roma being in a poor condition at average, which might have consequences to our findings. We tried to partially prevent this bias by controlling for the effect of disease severity in our analysis, but most likely the actual differences between the Roma and non-Roma patients were even large than that observed here.

Another limitation of the study was the relatively small number of Roma patients (46 from 537 interviewed patients, or 8.6%, which is quite characteristic for the population in Slovakia). The estimated proportion of Romas in the Slovak population is around 7%, thus the slightly higher ratio of Roma in our sample may reflect the higher prevalence of CHD among them. The results of the present study would benefit from confirmation in a longitudinal study with a bigger sample, which would also provide better insight into the causal relationships between the variables.

This study showed differences, in psychological factors that are relevant to the prognosis (psychological well-being, vital exhaustion, HRQL), between Roma and non-Roma patients with coronary heart disease. However, these differences were, to a significant extent, explained by SES; this supports the hypothesis of a significant impact of poor SES on ethnic inequalities in health among the Roma versus non-Roma populations. These results may also apply to other ethnic minority groups with a backward societal position.

Roma patients may warrant a personalized intervention (respecting their cultural background and specific attitudes toward health issues) when enhancing quality of life. Socioeconomic status appears to be a critical factor that needs to be taken into account in such intervention programs.

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